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M. Tech.

FUNDAMENTAL CONCEPTS OF BIOINFORMATICS

SUBJECT CODE : CS - 519 (Elective - III)

Paper ID : [E0693]

[Note : Please fill subject code and paper ID on OMR]

Time : 03 Hours **Maximum Marks : 100**

Instruction to Candidates:

1) Attempt any **Five** questions.
2) **All** questions carry equal marks.

Q1) (a) What is the difference between DNA and RNA, explain their different structures.

(b) Describe with a flow diagram. 'The central Dogma of Molecular Biology' highlighting the various steps. Explain the different molecules participating in information flow with respect to functional sites and interacting molecules.

Q2) (a) Differentiate between Prokaryotic and eukaryotic genes. Describe the role of introns and Exons in the processes of gene expression.

(b) How does triplet code help ribosomes to translate the information in DNA and RNA into amino acid sequence of Proteins?

(c) Why does Open Reading Frame considered to be a distinguishing feature of many prokaryotic and eukaryotic genes?

Q3) (a) What do you understand by peptide bond. Describe the salient features of primary secondary, tertiary and quaternary structure of proteins, give examples.

(b) How does protein fold, give its importance? Describe the various approaches of protein structure prediction.

4) (a) How does protein classified, give examples.

(b) Explain the different experimental technique for protein analysis.

Describe the x-ray crystallographic structure determination of protein.

P.T.O.

Q5) (a) Discuss the importance of sequence Alignment studies in Bioinformatics.

(b) Explain Needleman and wunsch algorithm technique for optimally aligning a pair of sequences.

Q6) (a) What is the importance of Phylogenetic analysis studies? Explain with a flow diagram the method for the determination of phylogenetic analysis studies.

(b) Discuss about "Molecular Phylogenetics".

Q7) (a) 'Substitution Rate' can be used as a measure of the functional importance of a gene explain.

(b) How will you perform the estimation of substitution number that occur between two nucleotides or amino acids?

(c) What do you understand by "Molecular Clock's and 'Evaluation Organelles".

Q8) Write short notes on (Any Four) :

(a) Nature of Chemical Bonds in Nucleotides and Proteins.

(b) Transposition Process.

(c) Dot-plots and scoring Matrices.

(d) Simple and Multiple sequence Alignments.

(e) Parsimony in character based methods of phylogenetics.

(f) Pest translational modification prediction of proteins.